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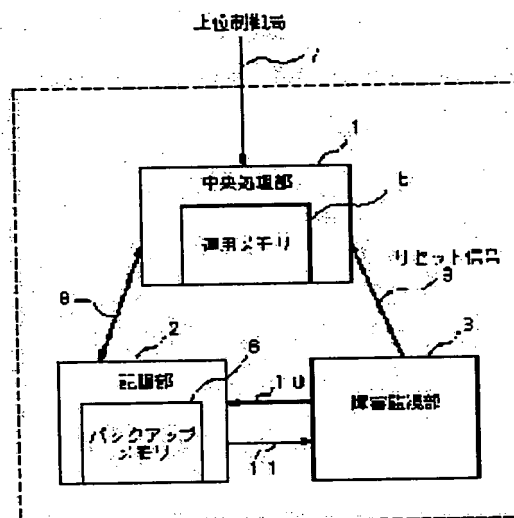
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(54) AUTONOMOUS PROGRAM FAULT RESTORING SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an autonomous program fault restoring system whereby a down-loaded program is automatically executed and restarting is autonomously executed even when a fault occurs due to the program.

SOLUTION: A central processing part downloads an operation program 7 from a high-order control station so as to store it in an operation memory 5 and executes the stored operation program 7. A fault monitoring part 3 monitors the central processing part 1 and transfers the operation program 8 which is preserved in a back-up memory 6 to the operation memory 5 of the central processing part 1 as against a storage part 2 when abnormality is detected. The storage part 2 preserves reads out the operation program from the operation memory 5 so as to preserve it in the back-up memory 6.



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CLAIMS

[Claim(s)]

[Claim 1] The program failure autonomous reinstatement system which carried out [restoring autonomously by calling said old program saved in said storage section when actuation by said program for updating which saved the old program which was operating by then in the storage section, and downloaded it after that just before downloading the program for updating was performed and the failure was detected, and making it reboot, and] as the description.

[Claim 2] the central-process section which downloads and performs a program, and; — the storage section which carries out the reading appearance of the old program currently performed, and stores it from said central-process section before this program execution that downloaded, and ; — the program failure autonomous reinstatement system characterized by to have the failure Monitoring Department which makes said old program which said storage section stores if the failure of said central-process section supervises and a failure detects transmit to said central-process section, and;.

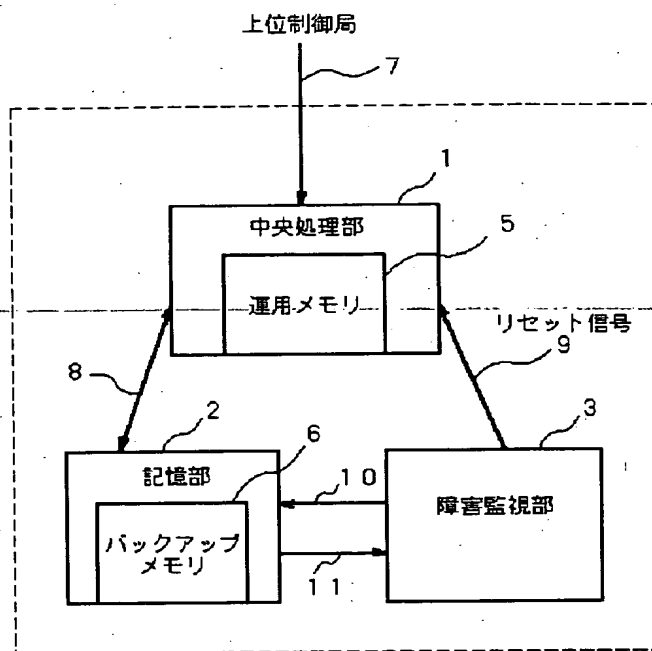
[Claim 3] The program failure autonomous reinstatement system according to claim 2 characterized by said central-process section having the memory which stores said downloaded program and said old program.

[Claim 4] The program failure autonomous reinstatement system according to claim 2 or 3 characterized by for said failure Monitoring Department to make said central-process section output and reboot the third signal in response to the second signal which outputs the first signal which makes said old program transmit to said central-process section to said storage section, and this storage section outputs after transfer termination at the time of said failure generating.

[Claim 5] The program failure autonomous reinstatement system according to claim 2, 3, or 4 by which said central-process section, said storage section, and said failure Monitoring Department consist of a microprocessor, memory, and a circumference circuit, and are characterized by being integrated-circuit-ized.

[Translation done.]

Drawing selection Representative drawing



[Translation done.]

just before downloading the program for updating is performed and a failure is detected.

[0010] moreover, the central-process section which downloads and performs a program and; -- the storage section which carries out the reading appearance of the old program currently performed, and stores it from said central-process section before this program execution that downloaded, and; -- if the failure of said central-process section supervises and a failure detects, it is characterized by to have the failure Monitoring Department which makes said old program which said storage section stores transmit to said central-process section, and;

[0011] Said central-process section is characterized by having the memory which stores said downloaded program and said old program.

[0012] It is characterized by said failure Monitoring Department making said central-process section output and reboot the third signal in response to the second signal which outputs the first signal which makes said old program transmit to said central-process section to said storage section, and this storage section outputs after transfer termination at the time of said failure generating.

[0013] In addition, said central-process section, said storage section, and said failure Monitoring Department consist of a microprocessor, memory, and a circumference circuit, and are characterized by being integrated-circuit-ized.

[0014]

[Embodiment of the Invention] Next, the gestalt of operation of this invention is explained with reference to a drawing.

[0015] Drawing 1 is the block diagram showing the gestalt of one operation of the program failure autonomous reinstatement system of this invention.

[0016] The gestalt of this operation shown in drawing 1 consists of the central-process section 1 which performs the administration program stored in the employment memory 5, the failure Monitoring Department 3 which detects the failure of the central-process section 1, and the storage section 2 which has the backup memory 6 for administration program preservation.

[0017] The central-process section 1 downloads the administration program 7 from a high order control station, stores it in the employment memory 5, and performs this stored administration program 7. If the failure Monitoring Department 3 supervised the central-process section 1 and abnormalities were detected, before it saves to the storage section 2 at a backup memory 6, it makes an administration program 8 transmit to the employment memory 5 of the central-process section 1.

[0018] Drawing 2 is a flow chart explaining actuation of the gestalt of this operation. In addition, the thing corresponding to the component shown in drawing 1 in drawing 2 attaches the same reference figure or the same sign, and omits the explanation.

[0019] Next, with reference to drawing 1 and drawing 2, actuation of the gestalt of this operation is explained more to a detail.

[0020] Just before downloading the administration program 7 from a high order control station in the employment memory 5, before employing the storage section 2 till then, it reads an administration program 8 and stores it in the built-in backup memory 6 (STEP1).

[0021] The central-process section 1 downloads the administration program 7 updated from a high order control station, and this downloaded administration program 7 is written in the employment memory 5 (STEP2).

[0022] The failure Monitoring Department 3 will output a reset signal 9 to the central-process section 1, if completion of download is detected, the administration program 7 written in the employment memory 5 by this reset signal 9 starts it, and it starts operation (STEP3).

[0023] As for the inside of systems operation, the failure Monitoring Department 3 supervises employment of the central-process section 1 (STEP4).

[0024] Abnormalities are in employment by the updated administration program 7 at this time, and when a failure occurs to a system, the failure Monitoring Department 3 detects this (STEP5).

[0025] The failure Monitoring Department 3 will output the write-in demand signal 10 to the storage section 2, if a failure is detected (STEP6). Before saving the storage section 2 with the write-in demand signal 10 at a backup memory 6, it transmits an administration program 8 to the

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the program failure autonomous reinstatement system which returns autonomously from the failure by download of a program about a program failure autonomous reinstatement system.

[0002]

[Description of the Prior Art] In the latest communication link and information processing system, in order to make a property change of a system, a program is updated timely in many cases. For example, although a certain base transceiver station updates a program by remote operation from the radio control office which is high order equipment, when the code which was mistaken in the program which should be updated is contained, a system will lapse into the situation not only of the base transceiver station being unable to start but becoming impossible even as for renewal of the program by remote operation for the second time. When it lapsed into such a situation, the system administrator needed to go to the location in which the base transceiver station is installed, and needed to start the system.

[0003] As an example of a system which avoids such a situation, the "system definition information update process method" given in JP,4-52825,A is learned.

[0004] In this official report, when updating a system, make a system suspend, and after making the program for updating download, it is made to reboot, and checks that a system applies normally. Thereby, the justification of renewal of a system can be checked.

[0005] When a system cannot apply normally as a result, a system is rebooted by the program of the previous version stored in the storage section as backup before download. Therefore, even when actuation of a system becomes unusual by modification of a system, the technique which says that it becomes possible by the reboot by the previous-version program to make it return to the condition before updating a system is indicated.

[0006]

[Problem(s) to be Solved by the Invention] The conventional program failure autonomous reinstatement system mentioned above has the fault that the activity of employment preparation etc. occurs in order to carry out the procedure referred to as starting operation after the manager of a system checks the justification of a program once before the formal employment by renewal of a program and checks justification.

[0007] Moreover, if decision of the justification of the program which the operations manager downloaded is mistaken, it has the fault of even a reboot becoming impossible as for a system.

[0008] The object of this invention is to offer the program failure autonomous reinstatement system which can reboot autonomously even when the downloaded program is performed automatically and a failure occurs by the program.

[0009]

[Means for Solving the Problem] The program failure autonomous reinstatement system of this invention is carrying out calling and rebooting said old program saved in said storage section, and restoring autonomously as the description, if actuation by said program for updating which saved the old program which was operating by then in the storage section, and downloaded it after that

employment memory 5 (STEP7). After ending this transfer, the storage section 2 outputs the write-in reply signal 11 to the failure Monitoring Department 3, and notifies transfer termination of the administration program 8 before updating (STEP8).

[0026] If the write-in reply signal 11 is received, the failure Monitoring Department 3 will output a reset signal 9 to the central-process section 1, and will reset a system (STEP9).

[0027] The central-process section 1 starts operation by the administration program 8 before updating (STEP10).

[0028] When the abnormalities by the downloaded administration program 7 occur by above-mentioned actuation, since the before administration program 8 downloads automatically, a system is returned normally. Moreover, when operating a system normally by the downloaded administration program 7, since the preparatory work by the system administrator etc. is not needed but it carries out automatically, employment can be saved labor. —

[0029] In addition, it is also possible by the object system by the above-mentioned configuration necessarily not being limited to the big system of magnitude, and the central-process section 1 consisting of a CPU and RAM, for example, the storage section 2 consisting of backup RAM, and the failure Monitoring Department 3 being constituted by circumference circuits, such as a logic IC, and integrating these further to be included in a small system or equipment of magnitude etc.

[0030]

[Effect of the Invention] As explained above, the program failure autonomous reinstatement system of this invention Since the reboot by the administration program can carry out automatically before being saved at the backup memory, even when the downloaded program is performed automatically and a failure occurs by the program While being able to save labor employment in the time of renewal of a system program, even when abnormalities occur in the employment after updating, it has the effectiveness that the failure return of a system can be performed autonomously promptly.

[Translation done.]